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EFFECTS OF SPECIAL TRAINING ON THE ACHIEVEMENT AND ADJUSTMENT OF GIFTED CHILDREN.

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AN EXPERIMENTAL 8-WEEK SUMMER PROGRAM FOR GIFTED CHILDREN IN RURAL AREAS AND TOWNS WAS TESTED FOR EFFECTIVENESS. THE HYPOTHESIS OF THIS PROJECT WAS THAT THERE WOULD BE NO SIGNIFICANT DIFFERENCE IN ACHIEVEMENT OR ADJUSTMENT BETWEEN STUDENTS PARTICIPATING IN THIS SPECIAL PROGRAM AND STUDENTS WHO HAD THE SAME INTELLIGENCE BUT NO SPECIAL TRAINING. THREE GROUPS OF 60 FIFTH-GRADE CHILDREN EACH WERE ESTABLISHED. EACH SUBJECT HAD AN IQ ABOVE 120. AN EXPERIMENTAL GROUP AND A CONTROL GROUP WERE PRETESTED AND ORGANIZED. POST-TESTING WAS DELAYED APPROXIMATELY 1 ACADEMIC YEAR FOLLOWING THE CLOSE OF THE SPECIAL SUMMER SESSION FOR THE EXPERIMENTAL GROUP. THE THIRD GROUP WAS SELECTED FROM A NEARBY COMMUNITY FOR TESTING AND STUDY, BUT BECAUSE SIGNIFICANT DIFFERENCES EXISTED IN THE INITIAL ACHIEVEMENT SCORES BETWEEN THIS GROUP AND THE EXPERIMENTAL GROUP, ADEQUATE COMPARISONS COULD NOT BE MADE. BASED ON THE ANALYSIS OF THE DATA AND FINDINGS, THE NULL HYPOTHESIS WITH RESPECT TO GROUP DIFFERENCES WAS PARTIALLY SUBSTANTIATED. SUCH FUNCTIONAL AREAS AS LIBRARY RESEARCH AND CRITICAL THINKING WERE EMPHASIZED DURING THE SUMMER PROGRAM, AND THE EXPERIMENTAL GROUP DID EXCEL IN THEM. IT WAS SUGGESTED THAT, WITH THE POSSIBLE DEVELOPMENT OF OTHER MEASURING DEVICES TAILORED TO THE OUTCOMES OF EXPERIMENTAL SUMMER SESSIONS, MORE PRONOUNCED DIFFERENCES BETWEEN EXPERIMENTAL AND CONTROL GROUPS MIGHT BE DISCOVERED. (JH)

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EFFECTS OF SPECIAL TRAINING ON THE ACHIEVEMENT AND ADJUSTMENT OF GIFTED CHILDREN*

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1960

PREFACE

Funds and resources for this study were provided by the United States Office of Education of the Department of Health, Education, and Welfare, the Iowa State Department of Public Instruction, and the Iowa State Teachers College. Dr. Tom A. Lamke was the original investigator, but, because of an illness which resulted in his untimely death, he was unable to analyze the data or to prepare the final report.

The present writer, with the help of Dr. Harry LaPine, Research Associate for the second phase of the research continuing under this same title, has prepared this report from materials in the files. She wishes to express her deep appreciation to Dr. LaPine for his helpfulness throughout its preparation, and to Dr. Gordon Rhum, Co-ordinator of Research, Iowa State Teachers College, for his help so graciously given in the analyses of the data and in the reading of the manuscript. She wishes also to acknowledge the contributions of the following people to the project:

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CHAPTER I

THE PROBLEM AND THE HYPOTHESES

I. IMPORTANCE OF THE PROBLEM

Among the problems facing the public schools today is the clamor over the so-called "shortage of talent"--a shortage created in part by the decreased birthrate in the 1930's and in part by the increased demand for greater numbers of trained personnel to meet the needs of our postwar economic expansion and to enter into the space, missile, and armament competition for national security. Schools are being faced with the accusations implied in titles such as these appearing in current popular and professional publications: "Are Gifted Children Being Adequately Provided For?" "Waste of Fine Minds," "Young Geniuses: Our Greatest Waste," "All-American Learning May Discourage the Gifted," "Lowest-Common Denominator Education," "America's Forgotten Child, the Gifted." Sensational writers are attempting to arouse us to greater interest in the gifted by comparing the numbers of scientists and engineers we are producing with the numbers being trained in Russia, for example, and by proclaiming Russia's accomplishments in identifying and educating able students in keeping with their levels of abilities.

It is the contention of many that much talent is being wasted and that a large proportion of our gifted are making only mediocre contributions to the society to which they belong. This contention is

supported in part by the available estimates of the low proportion of able people who obtain various advanced college degrees.

Dael Wolfle in his report on America's Resources of Specialized Talent reported that "fewer than half of the upper 25 per cent of all high school graduates ever earn college degrees; only six out of ten of the top 5 per cent do" (55:269).* Whereas, Doctor Conant, in his opening remarks to the NEA Invitational Conference on the Academically Talented Secondary School Pupil, stated that "some 15-20 per cent of a typical American comprehensive high school . . . .should be going to college" (40:16).

This does not imply that an advanced college degree is essential in all areas of endeavor for making a contribution to society in keeping with ability, but this is the evidence used to accuse the schools and society of "wasted talent" and we must face the fact that there are serious shortages in many areas which do require advanced educational training. Undoubtedly there is a large potential of intellectual resources that we fail to utilize to the fullest because of lack of training.

The testing programs of young men entering the armed services during World War II revealed many able individuals who had not previously been identified as gifted. Many of these could not at that point be trained sufficiently for their country to benefit from their gifts.

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*Numbers in parentheses are used to refer to sources listed in the bibliography. The number preceding the colon indicates the reference cited and the number following the colon indicates the page number within the reference.

They were too seriously handicapped by their past neglect of education plus habits and attitudes which deterred them from responding to opportunities for learning.

Lack of continuance in school of so many bright students has been attributed to inadequate stimulation in the school program at the elementary levels. All too often the top ten per cent is held back to the level of much of the other ninety per cent, frustrated, bored, and feared by both parents and teachers whom they outstrip in capabilities. Terman indicated his opinion of the importance of stimulation in the school program when he stated that "no method or combination of methods for the gifted will succeed that does not awaken their intellectual ambition" (41:18). In discussing educational causes for talent waste, the committee preparing Education of the Gifted also expressed the same idea in this fashion:

> Sometimes curriculum offerings are restricted in scope; sometimes the quality of instruction is poor; sometimes books and other equipment are insufficient or of poor quality; but probably the most frequent type of educational inadequacy is the failure to challenge the gifted students to achieve up to capacity (10:29).

Later in the same publication is the statement that "some human talent is wasted because the schools fail to identify, to challenge, to hold, or to educate adequately some of their gifted students" (10:86).

Though interest in providing adequately for the intellectually gifted has grown tremendously in the last half-century, Passow feels that "few schools have adequately met the challenge" (46:4). Various surveys in which high proportions of administrators report no special provision for the gifted substantiate this statement (44).

An examination of the suggestions and methods which are now in use for the education of these intellectually gifted reveals that they frequently are impractical or impossible in small communities or rural areas. Since almost fifty per cent of the population of the United States, and thus roughly fifty per cent of the children who would be classified as gifted or talented, is found in rural areas and in communities of fewer than 10,000 (51:1-5), it is extremely important that some educational method or technique be devised which can be administered successfully to provide more adequately for these children in such areas.

Havighurst, writing in Education for the Gifted, states that

> of special importance is the development of programs for gifted children in the small towns and the villages of the country which do not have the numbers of students or the variety of resources to allow a variegated special program for gifted youth. These small-to-medium-sized communities can do much more than they now do, given interest and imagination on the part of teachers and school administrators (41:10-11).

II. STATEMENT OF THE PROBLEM

The program at the Iowa State Teachers College was set up in an attempt to devise and test just such a procedure which would be administratively, financially, and educationally feasible to deal with the gifted children in the small towns and villages of which Havighurst was speaking. This investigation involved (1) an eight-week summer session for gifted children, (2) daily transport of gifted children to a central location, and (3) a curriculum adapted to the special abilities of this type of children and to the kinds of schools which they attend

during the regular year. There is every indication that a similar procedure could be used in small communities and rural areas to take care of children there.

Two significant features concerning the design of this study were these: (1) an experimental group and a control group were each composed of sixty subjects and (2) post-testing was delayed approximately one academic year following the close of the special session for the experimental group.

III. THE HYPOTHESES TO BE TESTED

The major purpose of this study was to investigate the effects on achievement and adjustment during the following year of the training which was given to a group of gifted children enrolled in a special summer program. The study was designed so that an experimental group enrolled in the summer session could be compared with a control group drawn from the same school population. The specific null hypotheses being tested were as follows:

1. There will be no significant differences between the experimental group and the control group in gains in achievement during the following school year as measured by the Iowa Tests of Basic Skills (36, 37).

2. There will be no significant differences between the groups in gains in adjustment as measured by the SRA Junior Inventory-Form S (47).

3. There will be no significant differences between the groups in changes in interests as measured by the What I Like to Do inventory (50).

4. There will be no significant differences between the groups in personal-emotional security as measured by the Institute of Child Study Security Test (The Story of Jimmy) (19).

5. There will be no significant difference between the groups on a locally adapted test of critical thinking.

6. There will be no significant difference between the groups on a locally adapted test of correctness and appropriateness of written expression.

7. There will be no significant difference between the groups on a locally adapted test of library research skills.

In addition to the previously mentioned experimental group and control group, a third group of sixty children was selected from a nearby community for testing and study. This third group was considered originally as a possible special control group, and participated in the same testing as the other two groups. Though this group did not differ significantly from the experimental group with respect to intelligence, significant differences in initial achievement scores between the two groups did exist. Therefore the anticipated comparisons could not be made. The data relating to this group, designated as Group B, will be presented and analyzed with reference to group gains or normative data.

CHAPTER II

RELATED RESEARCH

Interest in gifted children and in the proper educational program for them is not new, relatively speaking. It was in 1868 that Superintendent Harris of St. Louis, Missouri, introduced his program of flexible and frequent promotions for the academically able students in the St. Louis schools. Similar administrative practices soon were established in other schools, followed closely by variations including double promotions, skipping grades, special classes, special schools, credit by examination, and other such accelerative techniques of which many are still in practice today.

The various programs for providing for the intellectually gifted may be classified broadly into three types:

1. Acceleration--in which the gifted cover essentially the same standard curriculum as do other students but at a more rapid pace or in which the gifted skip certain grades in the school program.

2. Segregation or ability grouping--in which the gifted children are separated from other students in special schools, special classes, or special sections for at least a part of the time and methods and materials providing a broad, enriched program are planned for them.

3. Enrichment in the regular classroom--in which the gifted children follow the same general curriculum as their age-grade groups but their teachers provide extra experiences to give breadth and depth of understanding.

The desirability of and the effectiveness of these various approaches has been the subject of much discussion and disagreement.

All three have a common objective of providing a better educational program for talented children and each has had its era of popularity and its advocates. However, no one of them has been demonstrated to be outstandingly more successful or more desirable than any other. Nor are they mutually exclusive in their use. The Educational Policies Commission points out that enrichment is a policy rather than a plan and can be carried out with acceleration or segregation (10:56). Likewise acceleration may occur in conjunction with ability grouping.

From the inception of the flexible promotion plan in 1868 until early in the twentieth century, acceleration in its various forms was the characteristic technique used to provide for the exceptionally able student. However, there still existed a gap between the real achievement level of the talented student and his actual grade placement. Louis M. Terman, for many years the outstanding proponent of this procedure, pointed out in 1925 that although the typical gifted child was accelerated over 40% above his chronological age in actual knowledge of subject matter taught, he was accelerated only 14% in grade placement (49:306).

When Witty and Wilkins surveyed the research dealing with acceleration prior to 1933, they concluded that much of it to that date was "fragmentary, poorly conceived, inadequately controlled, and vaguely reported" (54:346)

Engle, Hobson, Justman, Miller, and Wilkins are a few who more recently have studied the academic progress of accelerated students (11, 23, 28, 29, 39, 52). Students in their studies were compared in some cases with matched non-accelerates and in other cases with the

members of their grade group. The progress of the accelerates was reported variously as satisfactory, better than the control group, and not significantly different from the control group. In no instance was the academic achievement of the accelerates lower than the achievement of the group with which they were being compared, but the superiority of acceleration remained equivocal.

As early as the 1920's educators began to feel that by acceleration the bright child was being cared for only in terms of his greater rapidity of learning and that his abilities for greater depth and breadth of understanding were being neglected. Also they became concerned over the problem of adjustment which might grow out of the disharmony among the rates of physical, emotional, social, and intellectual development. If a gifted individual were accelerated equivalent with his mental age or his academic achievement then he would be out of place socially and emotionally and likely to feel insecure and inadequate. Though Terman had pointed out that in actual knowledge of subject matter taught the typical gifted child is accelerated over 40% (49:306), he also pointed out that his acceleration in physical development is not likely to exceed 20-30 % (4:173).

The social and physical handicaps concurrent with sufficient acceleration to care for the gifted child have been described by Hollingworth in this fashion:

> If the child be accelerated in grade status so that he is able to function intellectually with real interest, he will be misplaced in other important respects. A child of eight years graded with twelve-year-olds is out of his depth socially and physically, though able to do intellectual work as well as they can. These problems come out clearly when we consider that seats and desks planned for twelve-year-olds will not fit him; that he will always be the last one

> chosen in athletic contests; that no one will know how to treat him at class parties; that the teacher will be prone to complain of his manual work, such as handwriting; and that he will be emotionally immature in comparison with older classmates (24:5-6).

Professor Hollingworth became one of the principal advocates of ability grouping and the removal of gifted children from the "lock-step systems" of the usual public school. She was convinced that homogeneous grouping was the answer to the education of gifted children wherever the population of such children was large enough to make such grouping possible. She began her studies in 1922 in an attempt to show the advantages of such an administrative device. In experimenting with children 7 1/2 to 9 1/2 years old in Public School 165 in New York City she found no significant differences in accomplishment in subject matter between the gifted children in her segregated groups with the special program and the non-segregated group. The achievement of these children seemed to be superior wherever they were. She concluded that

> the advantages to be hoped for from the homogeneous grouping of gifted children lie not so much in the expectation of greater achievement in the tool subjects of reading, arithmetic, and spelling as in an enrichment of scholastic experience with additional intellectual opportunities (20:261).

Others followed her in attempting to show the superiority of special schools, special classes, and special groupings which separated out the gifted with a specially made enriched curriculum for them, but results were not consistent. Subjective standards sometimes rated control groups higher on traits involving social and emotional growth, and achievement scores frequently showed no significant differences between groups. Nelson and Carlson in 1945 found essentially the same

thing that Hollingworth had earlier; i.e., that special class placement did not affect scores on achievement tests and that bright students achieved above grade placement in regular classes as well (43).

Since the 1930's enrichment in the classroom has gained increasing popularity. Surveys indicate the favor shown the procedure by both administrators and classroom teachers, though frequently the educators are unable to describe their programs very adequately or support their opinions with experimental evidence (6, 18, 22). Passow, in discussing the lack of evidence to support the practice, suggests that

> perhaps difficulties in designing research in this area account for the shortage . . . Schools might fruitfully conduct action research in this area to get needed evaluative data to support the arguments advanced in favor of this wide practice (41:304).

Although the progress of groups of gifted students using the Winnetka plan under Washburne (42:247-61) and self-administering units of enrichment under Dromsfield (9) was shown to be satisfactory in those situations, Carroll, writing in 1940, stated that

> the principal objection to enrichment for gifted children in the heterogeneous class is that in most cases it fails to work. Teachers are human beings with all the failings of human beings. Consequently, most of them prefer teaching procedures which require the least amount of time. They find it much easier to treat the class as a unit rather than as a loosely organized group of sub-groups and individuals. Mass education is infinitely simpler than individual teaching (5:246-7).

The Educational Policies Commission ten years later pointed out that

> successful operation of differentiated enrichment . . . is greatly facilitated by having small classes, ample and varied instructional materials, flexible curriculum and standards, and versatile teachers. Such a combination of favorable conditions is as rare as it is desirable. Lacking it, the ideal of enrichment in heterogeneous classes is hardly ever attained satisfactorily (10:59).

The experimental program as set up at the Iowa State Teachers College might be described as a combination of special ability grouping and enrichment. The participants were all children of 120 I.Q. or above who were brought together in special homogeneous groups for the summer term. A special curriculum of enrichment activities was designed to help these children utilize their abilities more fully. The classes were small, the variety and supply of instructional materials was almost unlimited, and the teachers were thought to be extremely competent and versatile. At the end of the summer term the children returned to their usual heterogeneous classes in their regular schools.

CHAPTER III

THE PROCEDURE

I. THE SUBJECTS

The subjects chosen for this experiment were children who had completed the fifth grade in the spring of 1958 and who achieved an I. Q. of 120 or above on the Kennon-Nelson Tests of Mental Ability, Revised Edition, Form A for grades 3-6 (32). Two groups of sixty children each were selected by a random process from this school population of fifth graders who had been identified as having the requisite intelligence quotient. The experimental group was designated as Group A and the control group as Group C. One case was subsequently lost from the control group. The composition of the groups according to age is given in Table I, page 14, according to sex in Table II, page 14, and according to intelligence in Table III, page 15.

The sixty children in the original experimental group were transported daily to a single center for a special eight-week summer session involving a specially planned curriculum. They were randomly assigned to three class groups and one teacher was assigned at random to each group of twenty children.

A chi-square analysis of the differences between the groups in proportions of boys and girls indicated that these differences were significant at the .01 level. Thus, since there was some evidence in tables of norms for some of the measures used that boys and girls differed

TABLE I

CHRONOLOGICAL AGES OF ORIGINAL GROUPS A AND C IN APRIL, 1958

Chronological Age	Frequency	
	Experimental Group (N=60)	Control Group (N=59)
133 mos. - - 138 mos.	15	14
127 mos. - - 132 mos.	27	36
121 mos. - - 126 mos.	16	8
115 mos. - - 120 mos.	0	0
109 mos. - - 114 mos.	2	1
Mean* (ungrouped data)	129.40 mos.	129.98 mos.
Standard Deviation (ungrouped data) . .	5.22 mos.	3.60 mos

*Difference fell below the .05 level of confidence, difference in variances have been taken into account by the Cochran-Cox method.

TABLE II

PROPORTIONS OF BOYS AND GIRLS
IN ORIGINAL GROUPS A AND C

Group	Boys	Girls	Total
Experimental	36(60.0%)	24(40.0%)	60(100%)
Control	20(33.9%)	39(66.1%)	59(100%)

TABLE III

INTELLIGENCE QUOTIENTS OF ORIGINAL GROUPS A AND C ON THE REVISED STANFORD-BINET TESTS OF MENTAL ABILITY, REVISED EDITION

Intelligence Quotient	Frequency	
	Experimental Group A (N=60)	Control Group C (N=59)
145 - 149	1	0
140 - 144	0	1
135 - 139	5	3
130 - 134	9	8
125 - 129	17	18
120 - 124	28	29
Mean* (ungrouped data)	126.08	125.47
Standard deviation* (ungrouped data) .	5.56	5.11

*Difference fell below the .05 level of confidence.

in certain aspects of growth at the age and grade levels under consideration, and since it was possible that the experimental treatment might have affected the sexes differently, it was decided to reduce the number of cases for the statistical analyses in order to achieve proportional numbers of boys and girls in Groups A and C. Thus each of these two groups was reduced by random rejection to twenty boys and twenty-four girls for a total of forty-four cases per group. The nature of the reconstituted groups is shown in Tables IV and V on pages 16 and 17.

TABLE IV

CHRONOLOGICAL AGES OF REVISED GROUPS
A AND C IN APRIL, 1958

Chronological Age	Frequency	
	Experimental Group A (N-44)	Control Group C (N-44)
133 mos. - - 138 mos.	10	9
127 mos. - - 132 mos.	23	28
121 mos. - - 126 mos.	10	6
115 mos. - - 120 mos.	0	0
109 mos. - - 114 mos.	1	1
Mean* (ungrouped data)	129.45 mos.	129.84 mos.
Standard Deviation (ungrouped data) .	5.06 mos.	3.38 mos.

*The difference between means fell below the .05 level of significance, differences in variances having been taken into account by the Cochran-Cox method.

TABLE V

INTELLIGENCE QUOTIENTS OF REVISED GROUPS A AND C ON THE HENMON-NELSON TESTS OF MENTAL ABILITY, REVISED EDITION

Intelligence Quotient	Frequency	
	Experimental Group A (N=44)	Control Group C (N=44)
145 - 149	1	0
140 - 144	0	1
135 - 139	4	2
130 - 134	7	6
125 - 129	12	13
120 - 124	20	22
Mean* (ungrouped data)	126.45	125.50
Standard deviation* (ungrouped data)	5.95	4.90

*Difference fell below the .05 level of significance.

Like Groups A and C, the subjects in Group B also were children who had completed the fifth grade in the spring of 1958 and who had achieved an I.Q. of 120 or above on the Henmon-Nelson Tests of Mental Ability, Revised Edition (32). Sixty children were chosen at random from the children eligible for this group and designated as Group B. The children came from an Iowa school system which provides a planned enrichment program for the gifted during the regular year.

There were 24 boys and 36 girls in Group B. The composition of this group with respect to chronological age is given below in Table VI and with respect to intelligence quotient in Table VII, page 19.

TABLE VI

CHRONOLOGICAL AGES OF GROUP B IN APRIL, 1958

Chronological Age	Frequency
133 mos. - - 138 mos.	10
127 mos. - - 132 mos.	31
121 mos. - - 126 mos.	18
115 mos. - - 120 mos.	0
109 mos. - - 114 mos.	1
Total	60
Mean (ungrouped data)	128.80 mos.
Standard Deviation (ungrouped data)	3.88 mos.

II. DATA-GATHERING DEVICES AND PROCEDURES

The Henmon-Nelson Tests of Mental Ability, Revised Edition, Form A for grades 3-6 (32), were used to identify the rapid learners eligible for inclusion in this study. The tests were administered in April, 1958, to all fifth graders in the schools involved who had previously attained an I.Q. of 115 or above on any test of intelligence administered by the schools or who were recommended by their teachers for testing. A total

TABLE VII

INTELLIGENCE QUOTIENTS OF GROUP B ON THE HENMON-NELSON TESTS OF MENTAL ABILITY, REVISED EDITION

Intelligence Quotient	Frequency
145 - 149	0
140 - 144	3
135 - 139	3
130 - 134	11
125 - 129	20
120 - 124	23
Total	60
Mean (ungrouped data)	127.25
Standard Deviation (ungrouped data)	5.47

of 334 children were tested and 142 were identified as being eligible for the study. Two groups of sixty each, Experimental Group A and Control Group C, were then selected by a random process from the 142 eligible students.

The selected children then were given pre-tests during the first two weeks of May, 1958. The Iowa Tests of Basic Skills, Form 2 (37), were used as pre-tests of achievement. The same tests were a part of the post-testing which was done in April of 1959. Since the Iowa Tests of Basic Skills are administered customarily in many Iowa schools in late January, the reading scores and the arithmetic scores from that testing

were secured as post-test results. When the remainder of the battery, Form 1 (36), was administered in April by the investigators, the eighth grade level was used to minimize the ceiling effects which might influence the scores of capable fifth grade children, a possibility which had seemed evident at earlier testing.

Another test administered as a pre-test in May, 1958, and then as a post-test in April, 1959, was the SRA Junior Inventory-Form B, Second edition (47), a needs and problems inventory for children in grades 4 through 8.

The third test administered both as a pre-test and as a post-test was an inventory of children's interests, the What I Like to Do (50), First Edition, appropriate for grades four through seven.

Added to the post-testing in April was the Institute of Child Study Security Test, Elementary Form (19), a paper and pencil test designed to measure a child's social-emotional security. This instrument reflects an approach to measurement that is based on an assumption of projection.

Also added to the April post-testing were three tests in mimeographed form composed of certain items selected from the Iowa Tests of Basic Skills (36, 37) and from the Iowa Tests of Educational Development (35). The intent was to measure library research skills, critical thinking, and expression. These tests were entitled "Test I: Library Research," "Test II: Critical Thinking," and "Test III: Expression." Before being used in this study, these three tests were given experimental tryouts in another Iowa community and revised as a result. Nevertheless, additional study into their validity and reliability should be undertaken before further use is made of them.

Test I, which was designed to measure library research skills, contained thirty items covering the purposes of parts of a book, general knowledge of the types of sources to use to find particular kinds of information, use of the card catalog in a library, and knowledge of certain specific reference sources.

Test II, labeled "Critical Thinking," was composed of two poetry and eight prose reading selections varying in length from one to five paragraphs. Critical thinking was measured by means of accompanying test items demanding very careful and informed analysis of the material. There were sixty items in this total test.

Test III was constructed to test correctness and appropriateness of written expression. It was made up of a passage of three paragraphs written in "spread-out" form in which certain parts were underlined and numbered. Some of the underlined sections contained errors in capitalization, punctuation, and usage; some were examples of poor writing; and some were entirely correct. The student had to decide if a change were needed and, if so, which of the suggested ones was the proper revision. This test contained fifteen items.

The data gathering devices and procedures just discussed for Groups A and C were essentially the same for Group B. The community from which these children were selected provides a planned enrichment program for children in that system identified as eligible for it. All the children in that enrichment program plus any others recommended by school personnel were tested with the Henmon-Nelson Tests of Mental Ability, Revised Edition. A total of 130 children were tested and 68 were identified as having attained the required intelligence score of 120 to be included in this study.

During the first two weeks of May, 1958, the Iowa Tests of Basic Skills, Form 2 (37), the SRA Junior Inventory-Form B (47), and the What I Like to Do (50) inventory of children's interests were administered as pre-tests to these children. The post-testing program included these same tests, with the exception of the reading test in the ITBS battery which was omitted for this group, plus the Institute of Child Study Security Test (19) and the three locally adapted mimeographed tests. All tests were administered to this group at the same times that they were to Groups A and C.

III. PROCEDURE FOR ANALYZING THE DATA

The general plan of this investigation was to study the differences between the experimental group and the control group in growth in achievement, in awareness of personal needs and problems, in feelings of security, and in interests. In these comparisons of the experimental group and the control group, analysis of variance was applied to the differences in change score (differences between pre- and post-tests) means wherever this was possible. In the event no pre-test scores were available so that change scores could be computed, the analyses were carried out using the post-test scores.

Pre-test and post-test means for Group B are reported and compared with test norms wherever that seems feasible.

IV. THE CURRICULUM

The special eight-week session planned for the experimental group had for a general objective the improvement of certain attitudes,

appreciations, techniques, and knowledges which would help rapid learning children to utilize their abilities more fully. The more specific objectives of the summer program may be stated as follows:

1. To develop and improve the ability of each child to think independently and creatively.
2. To develop an appreciation for reasoning and proof.
3. To develop an understanding of the importance of objectivity and evidence.
4. To develop skill in logical reasoning.
5. To arouse and develop an increased awareness, an appreciation, and a respect for the role of the intellectual in the progress of mankind.
6. To develop skill in the use of library materials.
7. To improve the ability to do research--to select a problem, define it, and modify it; to survey, select, and obtain information from many sources; to analyze information, organize, synthesize, and evaluate it.
8. To cultivate in each child a sense of responsibility to himself and to the group.
9. To guide each child to a better understanding of himself, his peers, his family, and other associates.

The curriculum was designed around the subject matter interests of the children. These interests became one of the major vehicles for the accomplishment of the objectives of the program as each child was given the opportunity to do individual research on his particular chosen topic. The tools, techniques, and methodology of research were incorporated into each child's experiences as he developed his topic.

Each child was helped to limit his topic enough that he could survey the available literature, select the relevant information, and organize it into a research paper. Skills pertaining to using the library card catalog and other sources for locating information, preparing bibliographies,

taking notes, outlining, and any additional skills necessary in the writing of research papers were taught as the children became ready for them and needed them. The topics chosen varied from astronomy to penicillin to ancient history, but each served as the motivating influence for the learning of the skills and methods of conducting and reporting library research.

Experiences in planning and evaluation were provided as an integral part of the program. Each group, with the aid of the teacher, planned each day. Each child, also with the aid of the teacher, made daily, weekly, and bi-weekly evaluations of his activities and progress.

The rigidity of thinking displayed by the children pointed up the necessity for planned periods of activities designed to give experience in ideational fluency and redefinition ability. Such periods were incorporated in the daily program.

The children also participated in a study of human relations in which they were guided into discussions and role playing of such things as their own behavior, their peer relationships, and their family relationships.

It seems inadvisable, in the interest of maintaining the control situation, to give any more specific information about the curriculum in any greater detail at this time. This report pertains to only the initial phase of a larger continuing study which already has included another special summer program and involves delayed post-testing of other experimental and control groups in the same schools concerned with this initial portion of the study. Further description of the curriculum will be provided at the conclusion of the entire investigation.

CHAPTER IV

FINDINGS

Each of the three groups was given a series of tests which have been discussed in the preceding chapter. The subject of the present chapter is the analysis and interpretation of the outcomes of these tests.

A reduction in numbers of pupil-subjects in both Experimental Group A and Control Group C was necessary in order to obtain the same proportions of boys and girls in each group so that an analyses of variance might be employed. With the aid of a table of random numbers sixteen boys were eliminated from Group A and fifteen girls were eliminated from Group C. This procedure left twenty boys and twenty-four girls in Group A and in Group C.

Analyses of the data relative to the special third group, Group B, will follow the presentation of the findings pertaining to Groups A and C.

I. ANALYSES OF FINDINGS ON GROUPS A AND C

Academic Skills

The major instruments used for the measurement of academic skills were the Iowa Tests of Basic Skills (ITBS) (36, 37). Since it was desired to assess chiefly the relative gains of Experimental Group A as compared to Control Group C over a year's time the scores used were the change scores obtained by finding differences between each subject's 1958 pre-test grade-equivalent scores and his 1959 post-test grade-equivalent scores. In order to coordinate better with public school testing

the arithmetic and reading post-testing took place in January,1959, in contrast with the other post-testing in April, 1959; thus the time elapsed for these two areas was not one full year.

The data on the ITBS pre-test and post-test mean performances and variabilities of both Groups A and C are presented in Table XXII of the Appendix. Data for each of the individual tests of the ITBS battery are given in this table though the area scores were chosen for analysis.

Table VIII below contains data on the mean change scores of treatment Groups A and C and their subgroups on the five ITBS areas.

Table VIII

MEAN GAINS OF GROUPS A AND C IN THE FIVE AREAS OF THE IOWA TESTS OF BASIC SKILLS

Area	Interval Between Testings	Sex	Mean Grade Equivalent Gains	
			Group A	Group C
Vocabulary	12 mos.	Boys (N=20)	2.06	1.34
		Girls (N=24)	1.65	1.82
		Boys and Girls	1.83	1.60
Reading Comprehension	6 mos.	Boys (N=20)	.98	1.08
		Girls (N=24)	1.03	1.02
		Boys and Girls	1.01	1.05
Language Skills	12 mos.	Boys (N=20)	1.80	1.90
		Girls (N=24)	2.28	2.25
		Boys and Girls	2.06	2.10
Work-Study Skills	12 mos.	Boys (N=20)	1.84	1.71
		Girls (N=24)	2.09	1.68
		Boys and Girls	1.98	1.69
Arithmetic Skills	8 mos.	Boys (N=20)	1.10	.98
		Girls (N=24)	.99	.79
		Boys and Girls	1.04	.88

Before the analyses of variance involving the five test areas were carried out computations were undertaken for the purpose of verifying the homogeneity of the subgroups with respect to achievement. The method which has been followed throughout this study involved the computation of an F ratio for the two most disparate subgroup variances on each test; and the results were values of 1.21 (Vocabulary), 1.08 (Reading Comprehension), 1.25 (Language Skills), 1.43 (Work-Study Skills), and 1.59 (Arithmetic Skills), all of which failed to reach the .20 level of significance. Thus there was no evidence that the groups differed in variability.

An analysis of variance was carried out upon the data for each individual test area. Findings therefrom are reported in Table IX,Page 28.

An examination of this table reveals that there were two F values which were significant at the .05 level of confidence. One of these signifies the superiority of girls over boys in language skills, disregarding treatments. The other significant F value is that for the interaction in the vocabulary area. This reflects the fact that the experimental boys made greater gains in this area than did the control boys, while on the other hand the experimental girls made smaller gains than the control girls, though the differences between treatment subgroups were not significant.

Other tests of academic type skills-knowledges used were those known as "Library Research," "Critical Thinking," and "Expression," described in the previous chapter. They were administered only as post-test measures to both groups on approximately the same dates during the latter part of the sixth grade. The mean performances of the groups

TABLE IX

ANALYSIS OF VARIANCE OF CHANGE SCORES OF GROUPS A AND C
ON THE IOWA TESTS OF BASIC SKILLS

Source of Variation	df	Sum of Squares					Mean Square				
		Vocabulary	Reading	Language	Work-Study Skills	Arithmetic	Vocabulary	Reading	Language	Work-Study Skills	Arithmetic
Treatments .	1	1.229	.040	.026	1.804	.573	1.229	.040	.026	1.804	.573
Sexes	1	.025	.000	3.826	.254	.494	.025	.000	3.826	.254	.494
Interaction .	1	4.378	.072	.106	.421	.032	4.378	.072	.106	.421	.032
Within Groups	84	86.346	50.247	69.992	52.745	44.816	1.028	.598	.833	.628	.534
Total	87	91.978	50.359	73.950	55.224	45.915					

F

	Vocabulary	Reading Comprehension	Language Skills	Work-Study Skills	Arithmetic Skills
Treatments . . .	1.20	.07	.03	2.87	1.07
Sexes	.02	.00	4.59*	.40	.93
Interaction . .	4.26*	.12	.13	.67	.06

*Significant at the .05 level.

are shown in Table X below. On each of these tests the means for the experimental group were higher than the corresponding means for the control group.

TABLE X

MEAN SCORES OF GROUPS A AND C ON THREE LOCALLY ADAPTED SCHOLASTIC TESTS

Test	Sex	Mean Raw Score	
		Experimental Group A	Control Group C
Library Research	Boys (N=20)	18.20	15.85
	Girls (N=24)	20.46	17.79
	Boys and Girls	19.43	16.91
Critical Thinking	Boys (N=20)	34.55	32.20
	Girls (N=24)	35.21	31.62
	Boys and Girls	34.91	31.89
Expression	Boys (N=20)	8.05	8.05
	Girls (N=24)	8.04	7.67
	Boys and Girls	8.05	7.84

F ratios for the check on homogeneity of variances between subgroups were 1.61, 1.20, and 1.07 for Library Research, Critical Thinking, and Expression, respectively, all of them below the .20 level of significance.

In Table XI, page 30, are the findings from the analyses of variance of the scores on these tests. On Library Research and Critical Thinking the F's for treatment effects were significant at the .01 and the .05 level respectively; and in Table X it was shown that, throughout, the means for the experimentals equaled or exceeded the means for the controls. Of interest also is the fact that the F test indicated there was a

TABLE XI

ANALYSIS OF VARIANCE OF SCORES OF GROUPS A AND C ON THREE LOCALLY ADAPTED SCHOLASTIC TESTS

Source of Variation	df	Sum of Squares			Mean Square			F		
		Library Research	Critical Thinking	Expression	Library Research	Critical Thinking	Expression	Library Research	Critical Thinking	Expression
Treatments	1	140.009	201.012	.925	140.009	201.012	.925	8.16**	4.11*	.15
Sexes . . .	1	96.215	.038	.837	96.215	.038	.837	5.61*	.00	.14
Interaction	1	.546	8.300	.764	.546	8.300	.764	.03	.17	.13
Within Groups .	84	1,441.670	4,111.730	510.192	17.163	48.949	6.074			
Total . . .	87	1,678.440	4,321.080	512.718						

*Significant at the five per cent level.

**Significant at the one per cent level.

significant difference between the sexes on the Library Research test, the girls making higher scores than the boys in both groups regardless of treatments (see figures in Table X). Analyses of the scores on the test of Expression revealed no significant differences either between treatment groups or between the sexes. However, here also the A group outperformed the C group, so that there was a consistent trend for the experimentals to exceed the controls in the quality of their performances.

Social and Emotional Security

The Institute of Child Study Security Test (19)afforded a measurement of two variables in the social-emotional area; viz., security and consistency. It was hypothesized that the experimental group might have gained in the areas measured as a consequence of their involvement in the summer session. In that session, classroom discussions on human relations were carried on regularly by the pupils. The intent of these was to increase personal effectiveness, which would seem to involve the factors of personal security and consistency to some degree.

The mean scores of Groups A and C on both component variables are presented in Table XII, page 32, where they may be compared.

The F ratios relating to homogeneity of variances had values of 1.26 (Consistency) and 1.07 (Security) for the two least alike subgroups on these variables. Therefore, it may be concluded that subgroup variances were essentially homogeneous (neither ratio reached the .20 level).

The analyses of variance were carried out with the results shown in Table XIII, page 32. These analyses indicated that the differences between Groups A and C were not great enough to be statistically significant.

TABLE XII

MEAN SCORES OF GROUPS A AND C ON THE INSTITUTE OF CHILD STUDY SECURITY TEST

Variable	Sex	Mean Raw Score	
		Experimental Group A	Control Group C
Consistency	Boys (N=20)	51.45	52.75
	Girls (N=24)	58.92	54.75
	Boys and Girls	55.52	53.84
Security	Boys (N=20)	82.20	82.90
	Girls (N=24)	85.62	83.46
	Boys and Girls	84.07	83.20

TABLE XIII

ANALYSIS OF VARIANCE OF SCORES OF GROUPS A AND C ON THE INSTITUTE OF CHILD STUDY SECURITY TEST

Source of Variation	df	Sum of Squares		Mean Square		F*	
		Consistency	Security	Consistency	Security	Consistency	Security
Treatments	1	62.227	16.409	62.227	16.409	.38	.59
Sexes	1	488.824	86.547	488.824	86.547	2.99	3.11
Interaction	1	163.007	44.825	163.007	44.825	1.00	1.61
Within Groups	84	13,747.031	2,340.583	163.655	27.864		
Total	87	14,461.089	2,488.364				

*All fell below the .05 level.

Needs and Problems

The SRA Junior Inventory-Form S (47) was administered in May of 1958 as a pre-test and was repeated in late April of the following year. This measure of adjustment yielded the results with respect to average changes in adjustment that are shown in Table XIV below.

TABLE XIV

MEAN CHANGE SCORES OF GROUPS A AND C ON THE SRA JUNIOR INVENTORY-FORM S

Area	Sex	Mean Change	
		Experimental Group A	Control Group C
School	Boys (N=20)	1.15	.05
	Girls (N=24)	.88	-4.25
	Boys and Girls	1.00	-2.30
Home	Boys (N=20)	.70	.60
	Girls (N=24)	1.08	-1.58
	Boys and Girls	.91	- .59
Myself	Boys (N=20)	1.70	.15
	Girls (N=24)	5.00	-2.71
	Boys and Girls	3.50	-1.41
People	Boys (N=20)	-2.95	- .75
	Girls (N=24)	3.25	1.71
	Boys and Girls	.43	.59
Things in General	Boys (N=20)	-6.60	-3.55
	Girls (N=24)	-2.67	-2.62
	Boys and Girls	-4.46	-3.05

Although often very small, the mean changes between pre- and post-testing for experimental boys and girls separately and for the sexes

combined were positive (indicating more stated unsolved problems and unmet needs as time went on) in the first three areas--School, Home, and Myself--as contrasted with negative changes (fewer stated problems) for the control group. On the other two variables--People and Things in General--the average changes tended to favor the experimental group. However, it should be pointed out that perhaps the increases in the numbers of stated problems by the experimental group may have been an outgrowth of their discussions on human relations during the special session in which they brought problems out in the open and learned not to be reluctant to admit having problems.

In order to assess whether the variances between subgroups were significantly unlike an F ratio was calculated for the least similar pair of variances in each of the five adjustment areas. Findings were 1.27 (School), 1.14 (Home), 1.52 (Myself), and 1.53 (People), and 1.12 (General), all of which fell well below the .20 level thus signifying homogeneous variances.

When the analysis of variance was applied to the change scores (Table XV, page 35) on these five adjustment variables, none of the F ratios attained the five per cent level of significance.

Interests

The What I Like to Do (50) inventory of children's interests was administered as a pre-test to all subjects in Groups A and C in May, 1958, preceding the special summer session for the experimental children. All groups participated in post-testing sessions during April of 1959.

The present report includes analyses of only three of these areas; namely, Social Studies, Quiet Play, and Science. These three

TABLE XV

ANALYSIS OF VARIANCE OF CHANGE SCORES OF GROUPS A AND C ON THE SRA JUNIOR INVENTORY-FORM S

Source of Variation	df	Sum of Squares					Mean Square				
		School	Home	Myself	People	Things in General	School	Home	Myself	People	Things in General
Treatments	1	238.921	49.501	530.182	.558	43.682	238.921	49.501	530.182	.558	43.682
Sexes . . .	1	114.256	17.673	1.064	408.910	128.746	114.256	17.673	1.064	408.910	128.746
Interaction	1	88.289	35.932	206.864	76.362	49.364	88.289	35.932	206.864	76.362	49.364
Within Groups	84	13,008.625	4,548.667	15,597.708	9,908.158	18,048.708	154.865	54.151	185.687	117.954	214.866
Total . . .	87	13,450.091	4,651.773	16,335.818	10393.989	18,270.500					

	F*				
	School	Home	Myself	People	Things in General
Treatments . . .	1.54	.91	2.86	.00	.20
Sexes	.74	.33	.01	3.47	.60
Interaction . .	.57	.66	1.11	.65	.23

*All fell below the five per cent confidence level.

areas were judged to be the most relevant to the present investigation. During the special summer session the experimental children were encouraged to pursue their interests in the social studies and sciences and were exposed to the variety of interests represented in the group as the members shared their research findings and hobbies.

The mean change scores (pre-test to post-test) are shown in Table XVI.

TABLE XVI

MEAN CHANGE SCORES OF GROUPS A AND C ON THE WHAT I LIKE TO DO INVENTORY

Subtest	Sex	Mean Change	
		Experimental Group A	Control Group C
Social Studies	Boys (N=20)	- 8.95	- 9.50
	Girls (N=24)	- 3.25	- 2.58
	Boys and Girls	- 5.84	- 5.73
Quiet Play	Boys (N=20)	.15	- 2.70
	Girls (N=24)	.71	- 1.17
	Boys and Girls	.45	- 1.86
Science	Boys (N=20)	- 9.25	-17.90
	Girls (N=24)	-13.00	- 4.71
	Boys and Girls	-11.30	-10.70

It may be seen that the trend for each sex and for both groups in the areas of social studies and science activities was in the direction of a lessening of interests (negative scores). The one exception to this trend of decreasing interests was the increase of interest displayed by Experimental Group A in Quiet Play.

Homogeneity of variances was indicated by the F ratios of 1.43 (Social Studies), 1.22 (Quiet Play), and 1.40 (Science), none of which were significant at the .20 level of confidence.

In Table XVII, page 38, are summarized the findings from the analyses of variance for the three areas. These analyses indicated that on every subtest those differences between the means of treatment groups noted earlier were not significant. However, these analyses did indicate that there was one significant difference between the sexes. There was significantly less narrowing of interests in Social Studies among the girls of both groups than among the boys.

II. FINDINGS ON GROUP B

Academic Skills

The thirty-six girls and twenty-four boys who comprised the special group designated as Group B performed above their grade-level placement on the Iowa Tests of Basic Skills (36, 37) as did those in the previously discussed Groups A and C. The battery was first administered about one month before the close of the 1957-1958 school year when the children were in fifth grade and the Arithmetic Skills part was administered again the next January, 1959, while other parts, with the exception of the reading test which was omitted, were given again in April, 1959. The mean performances and variabilities on each area and each subtest within the battery are given in Table XVIII, page 39. The grade-equivalent gains for the three areas of Vocabulary, Language Skills, and Work-Study Skills averaged 1.58 over the twelve month period between testings; and the mean grade-equivalent gain for Arithmetic was .70 over the eight month period between testings in that area.

TABLE XVII

ANALYSIS OF VARIANCE OF SCORES OF GROUPS A AND C
ON THE WHAT I LIKE TO DO INVENTORY

Source of Variation	df	Sum of Squares			Mean Square			F		
		Social Studies	Quiet Play	Science	Social Studies	Quiet Play	Science	Social Studies	Quiet Play	Science
Treatments .	1	.284	118.227	7.682	.284	118.227	7.682	.00	2.49	.02
Sexes	1	868.256	23.864	486.246	868.256	23.864	486.246	6.01*	.50	1.04
Interaction .	1	8.075	5.185	1,565.564	8.075	5.185	1,565.564	.06	.50	3.34
Within Groups	84	12,136.283	3,993.042	39,394.508	144.480	47.536	468.982			
Total	87	13,012.898	4,140.318	41,454.000						

*Significant at the five per cent level.

TABLE XVIII

SCORES OF THE SIXTY GROUP B* PUPILS ON THE IOWA TESTS OF BASIC SKILLS

Test	Mean Grade Equivalent		Standard Deviation	
	First Testing	Second Testing**	First Testing	Second Testing**
Vocabulary	7.30	9.30	.74	1.27
Reading Comprehension	7.31	- - ***	.99	- - ***
Spelling	7.54	8.62	1.06	1.73
Capitalization	7.06	8.84	1.32	2.04
Punctuation	6.76	8.33	1.41	1.83
Usage	7.34	9.01	1.23	1.86
Language Total	7.82	8.69	1.22	1.52
Map Reading	6.90	8.19	.91	1.74
Reading Graphs and Tables .	7.49	8.14	.91	1.51
Knowledge and Use of Reference Materials .	7.10	8.83	1.25	1.56
Work-Study Total	7.77	8.39	1.03	1.42
Arithmetic Concepts	7.00	7.40	.67	.89
Arithmetic Problem Solving	6.59	7.58	1.15	1.01
Arithmetic Total	7.08	7.49	.94	.80

*Composed of 24 boys and 36 girls.

**Interval between the first and second testings approximated twelve months, except in the case of the arithmetic area where it amounted to about eight months.

***Test not administered.

Social and Emotional Security

The Institute of Child Study Security Test was administered to Group B at post-testing time in May, 1959, as it had been to Groups A and C. This test had not been included in the pre-testing program, so there are no measures of gains which might have occurred. Neither can comparisons be made with the norms with any degree of confidence. Norms available for the test are provisional norms only, based on a too few and a too select number of children in grades six, seven, and eight combined in a city outside the boundaries of the United States. Therefore any interpretation of the fact that the mean scores of Group B boys and girls were higher than those of the corresponding standardization groups must be made cautiously with these limitations in mind. The means for Group B and the norms group are given below in Table XIX.

TABLE XIX

SCORES OF GROUP B AND THE NORMS GROUPS ON THE INSTITUTE OF CHILD STUDY SECURITY TEST

Variable	Sex	Mean		Standard Deviation		Median	
		Norms Group	Group B*	Norms Group	Group B*	Norms Group	Group B*
Consistency	Boys . .	43.12	50.25	19.35	13.01	47.50	51.50
	Girls .	50.35	52.49	17.50	12.08	54.50	55.50
Security	Boys . .	76.13	79.83	13.98	12.22	80.50	80.50
	Girls .	80.62	82.31	9.35	5.35	83.00	82.95

*Composed of 24 boys and 36 girls.

Needs and Problems

The adjustment of this group was measured in two administrations of the SRA Junior Inventory, Form S (47). The first was conducted in May, 1958, when the children were in the fifth grade, and the later administration took place in late April, 1959. Therefore, this group of children can be compared to the published norms for the fifth and sixth grades.

In Table XX are presented the results of both testings showing medians of Group B and of the norms groups. In interpreting scores on this test, one should remember that a low score represents fewer expressed problems and a high score more expressed problems.

TABLE XX

SCORES OF GROUP B AND THE NORMS GROUPS ON THE SRA JUNIOR INVENTORY-FORM S

Area	Sex	Median			
		Grade 5		Grade 6	
		Group B*	Norms Group	Group B*	Norms Group
School	Boys	40	39	28	37
	Girls	30	33	21	32
Home	Boys	8	11	8	10
	Girls	10	10	10	11
Myself	Boys	27	25	23	25
	Girls	23	28	20	25
People	Boys	14	15	11	13
	Girls	13	14	11	14
Things in General	Boys	23	24	22	26
	Girls	23	25	20	25

*N's for boys and girls are 24 and 36 respectively.

In seven out of a total of ten comparisons at the fifth grade level the B group expressed an adjustment that was better than that of the norms group; and it equaled that of the norms group in another instance. However, both the boys and girls showed occasional slight tendencies toward expressing more adjustment difficulties than the more heterogeneous norms group (see School and Myself). By the end of the sixth grade the Group B boys and girls had excelled the norms group in every one of the five areas of adjustment. While the norms group made scores indicative of improvements in adjustments in just five instances, the Group B children improved in all ten. The improvement of Group B appeared to be greatest in the area of problems connected with School.

Interests

The report of the performances of both the boys and the girls on selected subtests of the What I Like to Do (50) inventory appears in Table XXI, page 43. This test also was administered twice, once at the end of the fifth grade and again at the end of the sixth grade. Comparisons may be made between median raw scores of both Group B and the norms groups at the two grade levels and also between the percentile ranks of those scores. In two out of the three areas, at both testings, Group B boys scored above the fiftieth percentile; at no time did the girls equal or exceed that level in any of the three areas. Also, while the boys seemed to maintain or exceed their relative percentile ranking from the fifth to the sixth grade, the girls ranked considerably lower in interest in social studies and science at the end of sixth grade than they had a year earlier. The decrease was particularly noticeable in the social studies area.

TABLE XXI

SCORES OF GROUP B AND THE NORMS GROUPS ON THE
WHAT I LIKE TO DO INVENTORY

Subtest	Sex	Group B*				Norms Group	
		Median Raw Score		Percentile Equivalent in Norms		Median Raw Score	
		5th Grade	6th Grade	5th Grade	6th Grade	5th Grade	6th Grade
Social Studies	Boys . . .	21	22	43	43	23	24
	Girls . .	22	11	47	15	23	22
Quiet Play	Boys . . .	20	22	55	73	19	18
	Girls . .	17	16	35	35	20	19
Science	Boys . . .	44	44	58	58	39	39
	Girls . .	30	20	38	27	35	33

*Composed of 24 boys and 36 girls.

III. SUMMARY OF FINDINGS

The over-all results of the foregoing evaluations of Experimental Group A compared with Control Group C were that the pupils of the former group showed various degrees of superiority in scholastic achievement, needs and problems, and social-emotional maturity but no appreciable difference in interests. This summarizes trends which, however, were not always significant in a statistical sense.

On the comprehensive academic skills battery the gains of the experimental and control groups were not significantly different. Perhaps the lack of any significant results favoring the experimental group may be a reflection of limitations inherent in the standardized scholastic test battery that was used. While this is considered a valid instrument for its customary purpose, that of measuring factors stressed in the usual public school curriculum, there may be some limitations in the battery for measuring the attainment of the goals of the special summer program for the experimental children. This conclusion appeared to be supported by the results obtained with tests adapted especially for this project, for it was on them that the experimental group achieved a somewhat consistent superiority over the control group. The experimentals outperformed the controls on both the Library Research test and the Critical Thinking test at statistically significant levels.

An interesting by-product of the analysis of variance on the ITBS Language Skills area was the fact that disregarding treatments, girls gained more than did boys. On the Vocabulary test boys of

Experimental Group A showed greater gain during the year's time than the girls of the same group or than the boys of the control group; but Group C girls made greater gains than the C boys or than the experimental girls. Though none of these differences were significant, the reversed trends within the groups did result in a significant interaction. Another secondary finding was the fact that on the Library Research test the girls did significantly better than the boys.

Inspection of the Consistency and Security scores on the Institute of Child Study Security Test revealed that as a total group the experimentals manifested greater degrees of these personal adjustment factors than the controls did. However, the findings from the analyses of variance indicated no significant differences.

Changes over the year that elapsed between pre-testing and post-testing times were analyzed for each of the five adjustment categories of the SRA Junior Inventory: School, Home, Myself, People, and Things in General. There was no over-all superiority of either group over the other. The changes favored the controls in the first three areas and the experimentals in the other two but not at satisfactory levels to be of statistical significance in any instance.

Results obtained from the three selected subtests of the interests inventory indicated that Group A had narrowing interests over the period between the end of fifth grade and the end of sixth grade in Social Studies and Science, and a broadening of interests in Quiet Play. The C Group showed narrowing interests in all three areas. However, there were no significant differences between the groups. The one significant

outcome of these analyses was the fact that the girls, disregarding treatment groups, did show significantly less narrowing of interests in Social Studies than did the boys.

A general conclusion is that the special eight weeks summer session for rapid learners was associated with some relative superiorities. The superiorities in the tests of Library Research and Critical Thinking were notable. These tests were attempts to measure abilities that were given some emphasis during the special summer session and the experimental children did excel on them. It is believed that with the possible development of other measuring devices tailored to measure the outcomes of experimental summer sessions, more pronounced differences between experimental and control groups might be discovered.

CHAPTER V

SUMMARY AND IMPLICATIONS

I. SUMMARY

The purpose of this investigation was to devise a special summer curriculum for a group of rapid learning children and then to study the effects of that curriculum on certain facets of the achievement and adjustment of those children approximately one school-year later. The investigation was designed in such a way that the children who participated in the experimental program could be compared with the children in an equivalent control group.

The instruments used to measure achievement were in the nature of skills tests. They were the Iowa Tests of Basic Skills and three locally adapted tests entitled "Library Research," "Critical Thinking," and "Expression." Instruments employed to give indications of adjustment and security were the SRA Junior Inventory-Form S and the Institute of Child Study Security Test. The What I Like To Do inventory was administered in order to study the children's interests.

It was hypothesized for the purposes of this study that the Experimental Group A would not differ significantly from the control group with reference to the following:

1. Gains in achievement on the Iowa Tests of Basic Skills
2. Performance on three locally adapted skills tests of library research, critical thinking, and written expression

3. Degree of social-emotional security as measured by the Institute of Child Study Security Test
4. Gains in adjustment as measured by the SRA Junior Inventory-Form S
5. Changes in interests as measured by the What I Like to Do inventory

Teacher-pupil planning was emphasized in the special program and the curriculum was planned around the children's interests. Each child was given the opportunity to do individual research on his chosen topic, and skills pertaining to the use of the library and the preparation of an individual research paper were taught as the needs arose. Problems of human relations, activities to develop redefinition abilities and ideational fluency, and practice in setting up goals and then evaluating progress toward those goals were included in the program.

Briefly, the findings relative to Experimental Group A and Control group C may be summarized as follows:

1. It should be noted in the beginning that both groups made mean gains on the Iowa Tests of Basic Skills in keeping with their general rate of previous progress. However, the differences between the groups were neither consistent nor significant, though Group A (boys and girls combined) did exceed Group C in mean gains in three of the five areas and Group C was superior in the other two areas. Therefore the null hypothesis relative to these tests can be accepted. The significant interaction resulting from the superiority of Group A boys and of Group C girls on the Vocabulary test may suggest that the experimental treatment yields markedly better vocabulary gains for boys than for girls.

2. The null hypothesis can be rejected in part with reference to the locally adapted measures of achievement. Group A exceeded Group C on research and critical thinking at the .01 and the .05 levels respectively. There was no significant difference on the test of written expression. The teaching of library research skills and of skills of independent and creative thinking were a part of the stated objectives of the program. It would seem that these skills were taught and were retained one year later.
3. The null hypothesis with respect to differences in social-emotional security can be accepted. There were very small differences between the groups of boys in Security or Consistency, and the greater trends on both of these factors which favored the girls in Experimental Group A were not significant at the .05 level.
4. The null hypothesis can be accepted with respect to comparisons of adjustment. Though there were some slight trends observed in some of the comparisons made, they were not consistently in favor of either group and none of the differences reached the .05 level of confidence.
5. The null hypothesis relative to apparent differences in interests also can be accepted. Minor differences in terms of narrowing of interests appeared but none of these differences between groups attained the .05 level of significance.

II. IMPLICATIONS OF THE INVESTIGATION

More study obviously needs to be made concerning special summer programs for rapid learning children. Trends evident in the present study seem to point up the possible advantages in providing summer experiences for children of a high level of ability. However, considerably more study needs to be devoted to the definition of the goals and of the particular type of curriculum which can be most beneficial. Perhaps the program should be pointed toward fewer goals; i.e., a concentration of effort toward some such goal as better adjustment at school and at home, the development of a greater degree of social-emotional security, or improvement of only one or two academic skills at a time. The summer program might be centered alternately around arithmetic, language skills, reading skills, or one of the content areas. Consideration also might be given to the extent that the children concentrate on the improvement of achievement in whatever areas they might be operating below their expectations.

The problems of evaluating outcomes of programs for gifted children need to be given careful consideration. As Gallagher (15:29,30) said,

> . . . the research worker does not have many of the tools he needs to evaluate special programs. . . . The special programs claim to develop creativity, originality of thought, ability to relate past knowledge to present and future situations, and ability to reason through difficult problems. Standard achievement tests have been administered before and after such programs, but to what effect? . . . the intellectually gifted child in a special group could make significant and meaningful gains without any changes appearing in the scores obtained on many achievement batteries.

With reference to the present investigation, further study should be made of the appropriateness of the instruments employed in attempting to measure the changes which may have reslted from the program--i.e.,

changes in achievement, attitudes, appreciations, patterns of behavior, and various other character traits. Additional techniques and devices need to be developed and employed which will define more clearly and seek out for more precise measurement such intangibles as mentioned above which have been very difficult to measure satisfactorily.

Unsolicited comments of numerous parents and teachers indicated that they seemed to feel that many of the children got along better at home, were easier to manage, seemed more responsible, were doing better in school, and so on. Many of the children also indicated on a free-response questionaire at the end of the summer session that they felt they understood themselves and others better and were getting along better at home and at school than before the session. It would seem that their feelings about their improved relationships were somewhat valid in the light of the remarks of the parents and teachers. Such data need to be collected more systematically to facilitate analysis. Though objective data are highly desirable, such techniques as interviews and various types of ratings by parents, teachers, and pupils can furnish acceptable evidence and need to be employed. Plans are in progress for the possible inclusion of evidence obtained by some of these types of data-gathering devices in the further phases of this study.

In addition to problems of appropriate and precise measurement of outcomes there are other problems which may be related to the inability of the present study to show consistent differences in favor of the experimental group; e.g., problems of length of session, opportunity to practice learnings, and attitudes toward the regular school program.

The special program for the experimental group was only eight weeks in length. Children were in school 39 half-days for a total of 117 hours (one day holiday on July 4). Following the session the children had from four to five weeks of vacation period before the beginning of the fall term of school. Perhaps to set trends in motion is all that can result from a program of such length. Possibly a longer session might produce results that would lend themselves more readily to measurement. There was no question in the minds of the teachers or the investigators that the children learned during the course of the summer term many skills which they did not know when they arrived. However, in the shortness of the session, perhaps these skills were not learned well enough to become habitual and so were forgotten. Also, though these children came from schools that were generally conceded to be good schools, the instruction in the classroom during the regular year may not have been scaled to the advanced level of the skills they were learning during the summer; thus the children had little opportunity to practice the learnings derived from the special program.

The fact that Group A did not exceed Group C (both groups were drawn from the same schools) in achievement may be a reflection of attitude toward school. It is conceivable that the experimental children pursued their own interests at times rather than fit into the routine and drill of the usual classroom situation. During the summer session they had been encouraged to concentrate on individual interests. The presentation of any skills had been in a strictly functional setting and had grown out of felt needs in a problem or interest-centered situation. Experience

with the special program possibly could have resulted in a critical viewpoint with which the children may have regarded certain traditional school situations during the following year. Instruments might be developed quite profitably which would measure changes in preferences for independent versus the traditional school activities.

The present investigation included 60 subjects in each of the groups. Larger samples would be more desirable and would lend stability to the findings. Another desirable addition would be a more comprehensive pre-testing program to facilitate observation of gains. Post-testing immediately following the special session also could give valuable data relative to immediate gains and changes. Comparisons with status a year later might bear important implications for general school practice. Consideration also needs to be given to obtaining samples which would contrast with each other as to range on variables such as intelligence, achievement, and adjustment. Such procedure has been initiated in the design of the second phase of the over-all project of which the present study is a part.

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APPENDIX

TABLE XXII

GRADE-EQUIVALENT SCORES OF GROUPS A AND C
ON THE IOWA TESTS OF BASIC SKILLS

Test	Mean				Standard Deviation			
	Experimental Group A (N=44)		Control Group C (N=44)		Experimental Group A (N=44)		Control Group C (N=44)	
	Pre-test	Post-test*	Pre-test	Post-test*	Pre-test	Post-test*	Pre-test	Post-test*
Vocabulary	7.80	9.64	7.63	9.23	.68	1.02	.63	1.10
Reading Comprehension .	7.97	8.95	7.74	8.79	.79	.88	1.00	.96
Spelling	7.50	8.93	7.12	8.48	1.04	1.69	1.16	1.77
Capitalization .	7.57	10.36	6.96	9.79	1.06	1.75	1.22	1.64
Punctuation . .	7.45	9.79	7.13	8.95	1.28	1.58	1.18	1.79
Usage	8.10	9.78	7.63	10.00	.98	1.52	1.22	1.36
Language Skills Total	7.66	9.72	7.21	9.31	.85	1.36	.83	1.29
Map Reading . .	7.62	9.74	7.84	9.70	.89	1.36	.68	1.53
Reading Graphs and Tables . .	7.74	9.19	7.85	8.70	.93	1.30	.67	1.32
Knowledge and Use of Reference Materials. .	7.63	9.97	7.30	9.46	.73	1.35	.82	1.55
Work-Study Skills Total	7.67	9.65	7.58	9.28	.64	.98	.60	1.21
Arithmetic Concepts . . .	7.57	8.57	7.47	8.60	.48	.85	.78	.92
Arithmetic Problem Solving .	7.28	8.14	7.14	7.81	.79	1.03	.93	.89
Arithmetic Skills Total	7.40	8.40	7.30	8.26	.73	.74	.80	.79

*Interval between pre-testing and post-testing approximated twelve months, except in the cases of the reading and arithmetic areas where it amounted to about eight months.